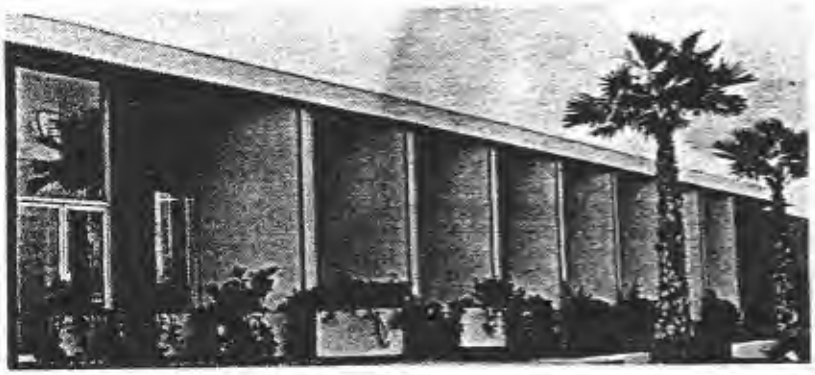

ELECTRONIC SPECIALTY

# Electronics Division News

Special Edition | December 8, 1968 | Portland, Oregon

**Welcome to Electronic Specialty Company's Portland Electronics Division!**

**The management and staff are happy to have this opportunity to show you our manufacuring facilities, and to describe some of the steps and critical operations which are required to build the precision instruments which we produce here. These instruments enjoy a wide acceptance throughout the industry in commercial applications as well as in the more glamorous field of guided missiles and space exploration.**

**Enjoy your visit. Ask questions. Let your imagination lead you into the exciting world of important miniature instrument manufacture.**

# ELECTRONICS DIVISION PRODUCTS SERVE COUNTRY WELL!

## RELAYS

The electro-mechanical relays produced by the Portland Electronics Division vary widely in size and application. However, the most important requirements for electronic components used in our country's military and space programs are small size, high reliability and long life under extreme operating conditions. This Division enjoys a good reputation for products of this type.

Relays control the switching of the electrical power which operates and controls the performance of satelites, missiles, and rockets by energizing the myriad pieces of equipment aboard them. The performance of a relay in a critical control system can make the difference between success or failure of a satelite launching, a missile hitting its target, or the performance of critical communications equipment, such as returning televised pictures to Earth.

Practically all satelites launched by this country have used ES relays. Many are now travelling through space, orbiting the sun, or resting on the moon. Still others are operating in nuclear submarines and in radar installations all over the world.

Some specific applications for our relays are these:

The Apollo program and its Lunar Excursion Module (LEM). Our 94 series relay controls the jettison of the second rocket stage, and controls the re-entry propulsion system.

The "Walleye" Missile, most popular air-to-ground missile used in Viet Nam, uses an ES relay to switch from aircraft power to the missile power system at time of launch.

The Mark 48 homing torpedo uses our relays as does the Pershing Missile, the Army's longest range surface to surface missile. Our relays are also used in the Aircraft Voice Warning System, which vocally warns the pilot of malfunctions.

Our 79N series relay is used in other missiles to help control the missile firing equipment. It is also used in mobile communications systems.

Other ES relays are used in aerial bomb releasing mechanisms and aircraft fire detection systems.

## GYROS

The gyroscopes produced in this Electronics Division serve as "attitude control" devices to stabilize aircraft, missiles and drones during the performance of their mission.

The Mark 46 Homing Torpedo (in which we also have relays) uses our NF6010A2 gyro, our smallest, to keep the torpedo on course and prevent it from circling back and homing in on the launching vessel.

Our N3200-4 and N3200 (K-7) are used in drone (unmanned) aircraft, both target drones for anti-aircraft gunnery practice, and surveillance drones which can carry TV cameras and infrared cameras. The aircraft is recovered and the film processed in field laboratories for immediate reconnaissance information.

The NF4111B-2 gyros are paired in a Target Drone, a high altitude, high speed unmanned aircraft. The drones are dropped from an aircraft at approximately 60,000 feet and attains a speed of Mach 2. It has a range of more than 120 miles and is used for air-to-air rocket practice.

The NF4110C is used in a guided bomb similar to the Bull Pup, which is launched from an aircraft and guided to the target by the pilot through a telemetry system.

Another application is in guided missiles.

The pilot of the deploying aircraft is able to see the ground through the "eyes" of the missile. When the target is acquired, the pilot locks the missile on and returns home. Even if the target is moving, the "eye of the missile flies it into the target. Our NV5009A and ND5018D gyros comprise the vertical and directional references of the missile autopilot.

The NV5003A-4 and NV5004A-4 gyros are utilized in both the Lunar Landing Research Vehicle and Lunar Landing Test Vehicle. These vehicle are units build by Bell Aerosystems, Buffalo, New York, originally to research the type of vehicle needed for our Gemini Program to land astronauts on the moon.

The Electronics Division also builds a reference system, J500, which uses our NV3401A gyro. This is the basis of the gun stabilization system on the battle tank. This sytem stabilizes the main gun to permit direct hits while moving or standing still.

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# Expansion Completed; Portland Div. Now Totals ½ Million Sq. Ft.

New 125,000 Square Feet addition was completed June 1968. Since Electronic Specialty Co., Portland Division moved into their new building in 1963, employment has increased from 600 to 1400 employees, making E.S. one of the more substantial contributors to Portland and Oregon's economic development. The Company is recognized as the industries leading producer of light-weight heat treated structural components for the airframe industry. Approximately 18 additional pieces of satellite equipment have been installed in the new wing of the plant.

## Portland Division Completes Installation Of First ES/ CRAMIC Super-Profiler in U.S.A.

The new ES/Cramic Super-Profiler reported to be the largest and most advanced design of any machine of its type in the country was conceived by the Electronic Specialty Co. and manufactured by Cramic Engineering Company in London, England.

The huge 280 Ton giant will utilize traveling gantrys with six 30 H.P. heads and Bunker Ramo electronic tape controls. The machine is 70 feet long and 22 feet wide.

Portland Division's new super-profilers have been designed to machine the Flap Tracks for the 747 airplane. Six 747 Flap Tracks, each weighing almost 9000 pounds, can be machined on a super-profiler which will simultaneously profile cut approximately 90 percent of the metal from the massive steel forging.

Seven more huge super-profilers will be installed in this facility within the next seven months.

## ES-CHEK Machine Developed

The ES-CHEK is a large coordinate measuring machine, developed and made at Electronic Specialty Co. as a common piece of equipment to the "Super Profilers". It will be used to verify quality of parts machined on these large profile mills, such as the "747" Flap Tracks.

The ES-CHEK has a measuring capacity of 2 feet by 5 feet and 18 feet. Power is supplied by MOO6 Servo Drives and Electronic Controller with accuracy of .001 and repeatability of .0005.

A print-out ( not installed) will make complete record of all dimensional data pertinent to part being inspected.

## New Lunch Room Completed, Improved

Portland Division welcomes you to visit their new lunch room which provides many new features and expanded, improved service.

Canteen Company feels that they will be able to speed service through the new line considerably. They are able to do this by utilizing a double line system and an automatic change making cash register system. As in the past, full line food service will be featured. The existing service line was extended, however to facilitate the addition of a beverage bar. This will speed service through the line by allowing those persons who desire just coffe, milk, or soft drinks to go through a short, quick service line.

Cashiering during peak service periods will be handled from a cashiering island, and with the utilization of the automatic change making cash register, the speed of service should be greatly increased.

Canteen Company has eliminated the coffee urns from the serving line and introduced coffee decanters at two serving points on the line. This will provide a higher quality and much fresher cup of coffee.

With the addition to the cafeteria, the seating space has been better than doubled for employees. We think that with the addition of space and faster service, our food service facilities will be a great deal more enjoyable for all.

**Welcome to Our Open House**

## New Heat Treat Furnace Installed

New Gantry Heat Treat furnace installed to meet the requirements of the aircraft aerospace industry. In order to assure ultimate quality, E.S. has installed four new heat treat furnaces each capable of handling a 10,000 pound load, 20 feet long by six feet wide. The furnaces which can generate heat up to 2,100 degrees F, inject a controlled mixture of gas with air and carbon monoxide to create a proper chemical reaction on the surface of the part being treated at 1,600 degrees F.

Electronic recording and control devices are used to monitor this reaction inside the furnace every 30 seconds and adjust the chemistry of the incoming gas accordingly. Portland now has the largest heat treating equipment of its type in the United States. One more furnace is on order and due for delivery soon. Each furnace is six feet in diamater and 24 feet in depth. A large capacity salt bath contains more than 90 tons of calciumcloride for the chemical/heat treatment process.